Opening Statement

Of

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Introduction

Good afternoon Chairman Linder, Ranking Member Langevin, and distinguished members of the subcommittee. As Director of the Domestic Nuclear Detection Office (DNDO), I would like to thank the Committee for the opportunity to discuss the research and development (R&D) activities of DNDO and how these activities will directly enhance the probability of mission success. I am pleased to be here with other distinguished witnesses, Dr. Marburger and Under Secretary Cohen.

In the past, I shared with this subcommittee some of the ways that DNDO is working with Customs and Border Protection (CBP) and the Department of Energy (DOE) to deploy radiation detection equipment domestically and overseas. Collaborating with our implementing partners to increase the effectiveness of nuclear detection globally is vital. However, greater security can be achieved through the development and deployment of increasingly sophisticated and innovative technologies throughout all three layers of the global architecture - overseas, at our borders, and within the United States.

As such, the DNDO has embraced a multilayered homeland-defense system much like the one recommended in the 2002 National Academies' report, "Making the Nation Safer: The Role of Science and Technology in Countering Terrorism." This methodology requires improved capabilities in detection and interdiction of illicit materials, intelligence fusion, data mining, attribution, and effective response to nuclear and radiological threats. To address these requirements, the DNDO maintains a preeminent research and development program, while simultaneously capitalizing on the benefits of integrating this program with larger acquisition efforts. Over 60% of DNDO's fiscal year 2007 budget request is intended for R&D activities. We believe this level of investment will help us achieve both R&D and acquisitions goals.

Detection and interdiction of illicit materials

The DNDO improves the probability of detection and interdiction by integrating and deploying current technologies, continually improving these technologies through near-term enhancements and transformational research and development, and expanding detection capabilities at the Federal, State and local levels. The technical challenges to radiological and nuclear detection that we face stem from trying to resolve operational challenges and other obstacles to effective detection like proximity to a source, shielding of a source, velocity of a transported source, and decreasing the rate of false and nuisance alarms.

DNDO development programs are directly tied to robust systems engineering and test and evaluation programs. The aim is to ensure that all acquired systems address identified capability gaps and have been fully evaluated prior to any acquisition decisions. Additionally, all deployed technologies will be accompanied by the appropriate training, exercise, and response protocols. This will ensure that systems are operated properly, and all alarms are immediately reported to the appropriate agencies and personnel. Deployed systems will also be red teamed to assess their true impact on homeland security.

While the baseline architecture will continue to be documented, the architecture team has begun examining options for strengthening the architecture in the near and long-term. These options will be evaluated in terms of risk reduction, direct and indirect costs, operational feasibility, and other relevant decision factors. In addition, recommended enhancements are being identified and prioritized. The DNDO and its internal interagency staff are reviewing and refining the recommendations to reflect the full range of technical and policy factors that must be addressed in determining the preferred overall architecture.

The international portions of the architecture are being developed in close coordination with the Department of Defense (DOD), DOE, and Department of State (DOS), as well as components of Department of Homeland Security (DHS) with international responsibilities and relationships. The border portions are closely coordinated both within DHS (e.g., with CBP and the Coast Guard), as well as with other relevant agencies. The interior portions of the architecture are being closely coordinated with the Department of Justice (DOJ), Federal Bureau of Investigation (FBI), and other Federal, State, and local entities.

A critical component of the DHS nuclear countermeasures architecture is a passive radiation detection portal suitable for examining cargo containers, trucks, privately-owned vehicles, mail, and bundled cargo. The Advanced Spectroscopic Portal (ASP) program is a next-generation radiation portal monitor that rapidly and accurately detects the presence of radiation at realistic operational settings, and also identifies the materials causing the alarms. This allows the dismissal of alarms caused by non-threatening sources, thereby reducing the operational burden due to nuisance alarms.

We have completed the initial engineering development phase of ASP and in support of this program have executed the first ever high fidelity test and evaluation campaign to measure the improvements in performance provided by these next-generation systems. To address concerns about the additional cost of these next-generation systems, DNDO also completed a Cost-Benefits Analysis of ASP and poly-vinyl toluene (PVT) radiation portal monitors (RPMs). We demonstrated that purchasing and deploying a mix of current and next-generation systems would result in time-savings costs, while significantly enhancing the effective ness of DHS Customs and Border Protection (CBP) secondary inspection operations, as well as greatly reducing secondary referral rates when ASP-like systems are used as a means of primary inspection.

On July 14th, 2006, DNDO awarded contracts to Raytheon Company, Thermo Electron Corporation, and Canberra Industries, Inc. for the development and production of ASP were announced on July 14. The priority for the first year is development and testing of the fixed radiation detection portal that will become the standard installation for screening cargo containers and truck traffic. In the near future, the DNDO will conduct testing and data collection of the first 27 ASP units at the Nevada Test Site (NTS), the New York Container Terminal (NYCT), Pacific Northwest National Laboratory (PNNL), and selected Ports of Entry (POEs) located in the north, south, east, and west. The DNDO will complete system qualification testing and the subsequent engineering changes as required – ensuring the pilot and production ASP units can withstand shock, vibration, temperature gradients, and other environmental stresses. Full-rate production (a decision based upon test results) is expected to begin in 2007.

The DNDO, in cooperation with CBP, will install and commission fixed and mobile ASPs ordered in FY 2006 (including 24 pilot units) and is planning orders for additional cargo portals, 30 SUV/truck- based systems, and 2 rail systems. By the end of calendar year 2007, planned deployments of current (PVT) and next generation (ASP) portals to all major seaports will provide coverage of 98% of all incoming seaborne containerized cargo, as well as over 90% of all containerized cargo passing through land border crossings. The DNDO will also be acquiring ASP systems on behalf of DOE for deployment through the Megaports Initiative, further enhancing the broader U.S. strategy to scan incoming cargo before it reaches our borders. A Memorandum of Agreement on DNDO/DOE cooperation is in negotiation and DOE has identified funds for the purchase of twelve ASP systems.

While spectroscopic portals will provide a next-generation capability to passively detect unshielded or lightly shielded nuclear materials, no passive system can detect nuclear materials that are heavily or completely shielded. Radiography systems (using active imaging techniques) can provide a solution to the challenge of detecting shielded nuclear material. To detect heavily or completely shielded materials like special nuclear material (SNM), and particularly highly enriched Uranium (HEU), DNDO is developing a next-generation radiography system that will minimize negative impacts on commerce and the flow of traffic. Cargo Advanced Automated Radiography System, or CAARS, will automatically detect high-density material shielded within cargo that could escape detection by radiation portal systems, like ASP. The automated image processing techniques envisioned for CAARS will also substantially improve throughput rates over current generation radiography systems. On September 8th, contracts were awarded to L-3 Communications, American Science and Engineering, Incorporated, and SAIC Corporation for the development of CAARS.

Fundamentally, DNDO believes that a combination of passive spectroscopic systems and advanced radiography systems will allow us to detect unshielded, lightly shielded and heavily shielded nuclear materials, components, and weapons that may be illicitly transported in cargo containers, air cargo bundles, or other conveyances.

In addition to portal monitors and radiography systems, DNDO is investing substantial funds to continue developing handheld, backpack, mobile, and re-locatable assets for non-Port of Entry (POE) venues. These systems are designed to integrate into existing law enforcement operations, providing cues for further investigative action when radiation is detected. DNDO acquired 88 improved handheld units in fiscal year 2006, of which 83 were provided to CBP operators for use in obtaining operational feedback for spiral development. We expect to purchase 407 handheld units in fiscal year 2007. Two Hundred and fifty seven units will be provided to CBP operators and 150 units will be provided to the USCG. By the end of FY 2007 the USCG will have rad/nuc detection capability for all inspection/boarding teams. Each system will have improved probability of identification, improved ability to communicate with a reachback center, and better durability for rugged field conditions.

We are also engaging with the Coast Guard (USCG) and State and local partners to address the challenges associated with radiation detection in the maritime environment. The harsh environment and operational constraints that the USCG faces makes development of effective

operational equipment a considerable technical challenge. As the Secretary has stated, one major goal for this Department is the deployment of radiation detection capabilities to all U.S. Coast Guard inspection and boarding teams by the end of 2007. To ensure that the Department accomplishes the Secretary's goals, DNDO is committed to developing a Joint Acquisition Plan with the Coast Guard to provide handheld and backpack radiation detection devices that will fulfill imminent operational needs in fiscal year 2007, as well as lead to the development of next-generation technologies that have the identification capabilities, connectivity, and ruggedness required in the maritime environment.

Despite the progression of our near-term R&D efforts, there are still key, long-term challenges and vulnerabilities in our detection architecture that require long-range, higher risk research programs to deliver the highest payoff improvements in detection capabilities. Our transformation research and development work will render next-generation technologies that address the current limitations of deployed systems. Significant advances in radiation detection technology could potentially impact all capability gaps in our present detection architecture, from the ubiquitous, distributed network of inexpensive radiation detectors to highly sensitive, standoff detection systems for sensing mobile threats at speed. We are launching initiatives to develop technologies to meet architectural challenges by pursuing a robust Exploratory Research Program to stimulate the entire field of nuclear detection sciences. The effort will involve participants across private industry, the National Laboratories, and academia. In order to achieve effective coordination between the numerous government agencies involved in related work on nuclear detection, the DNDO participates in the Counterproliferation Program Review Committee, co-chaired by DOD and DOE with members from the Intelligence Community, Department of State, and others, which provides a yearly report to the Congress and works to ensure that technology development in this area is fully integrated.

The discovery and development of new detection materials and concepts is a major focus of DNDO exploratory research over the next five years. We continue to pursue new methods and signatures that will provide techniques for verification of shielded special nuclear materials. In addition, we are adjusting algorithms and devising new models to improve the technical capacity of the equipment and increase the accuracy and reliability of the systems for operators. We are also conducting experiments and modeling to find ways to reduce the false alarm rate so that background radiation and non-threat sources are not necessitating escalated response protocols and wasting the time of law enforcement operators.

In December 2005, DNDO published a Call for Proposals to the National Laboratories soliciting novel detection approaches, materials, and advanced technologies. DNDO received over 150 proposals, and ultimately selected 44 for award, resulting in nearly $40 million in research programs. Similarly, DNDO released a solicitation in March 2006 for private industry and academia proposals in the same research topics. Over 200 white papers were submitted, and we are now in the process of evaluating 70 proposals for additional awards.

Beginning in 2007, we anticipate a third solicitation, specifically to support our Academic Research Program. This program will provide a much needed emphasis in nuclear detection sciences, a field that has been in decline at American universities for years. The future security of our Nation requires such a rejuvenation effort at our universities. A consistent, sustained

program to spur the academic community will provide the nuclear detection experts of the future. In addition, the program will foster potentially high risk but high payoff ideas that could lead to solutions that have not yet been considered.

We are also launching several Advanced Technology Demonstrations that will provide concept validation, the last phase in our exploratory research process. The first ATD is the Intelligent Personnel Radiation Locator (IPRL) that we solicited proposals for in April 2006. IPRLs are intended to ultimately replace the limited detection capability of existing radiation pagers with pocket-sized radioisotope detectors and identifiers that will wirelessly communicate with similar devices in the vicinity, automatically combining data to increase sensitivity and triangulate directional information. These devices will have sufficient energy resolution and sensitivity to reliably discriminate between normally-occurring radioactive materials (NORM), background, and potential threats, and will be used by law enforcement, first responder, counterterrorism, and possibly intelligence agencies in routine activities and surveillance. This year, the DNDO funded 3-year prototype-development efforts for IPRLs. The ATD will culminate in test and evaluation of the IPRL prototypes in early fiscal year 2009.

We are also pursuing the Stand off Detection ATD that aims to extend nuclear detection ranges beyond 100 meters, potentially allowing for airborne platform applications. Stand-off detection and imaging address the need for the capability to locate and identify nuclear threat materials at a distance, in both land and maritime environments. The DNDO will look at key existing technologies like gamma-ray imaging, advanced detection algorithms, and sensor and data fusion techniques that may dramatically improve sensitivity and directional accuracy. A solicitation on this topic will be released later this year.

Also in 2007, we expect that research into SNM verification will be transitioned to an ATD. We anticipate that active verification (AV) of SNM will be developed for secondary and primary screening at high throughputs to enhance detection and identification through development of gamma and neutron-based interrogation techniques.

Currently, we are pursuing an experimental modeling campaign to determine and characterize the background for cargo containers at sea, in order to determine the potential false alarm rates and feasibility of such systems. Following this effort, a Long Dwell Detection In-Transit ATD is being planned to explore our capabilities to exploit the time available during cargo transit to detect threat materials in cargo and conveyances.

Intelligence fusion and data mining

Successful detection alone will not lead to mission success. The DNDO must ultimately have the ability to fuse detection data and intelligence assessments in a near real-time environment to maintain overall system and situational awareness. This plan will require the DNDO to closely interact with the Intelligence Community, through the DHS Office of Intelligence and Analysis (I&A), as a developer of intelligence requirements and consumer of intelligence products. However, it should be made clear that the DNDO will not act as an intelligence collection agency. To meet the information and analysis mission, the DNDO has established the Joint Analysis Center (JAC). The JAC will enhance the effective sharing and use of nuclear detection information and

intelligence from all mission related detection systems to provide a greater situational awareness of the nuclear and radiological threat. By fusing the international and domestic detection streams of information generated by the intelligence and counterterrorism communities, the JAC will be able to provide a better informed decision making environment, enabling more effective alarm resolution, trend analysis, and threat awareness. Additionally, this information and analysis capability will be integrated with a detailed understanding of current and future detection system performance to increase our awareness and confidence in the global detection architecture.

Forensics and Attribution

The DNDO must also support national capabilities to conduct forensics in support of attribution activities. In fiscal year 2007, DNDO will assume the mission to stand up and manage the National Technical Nuclear Forensics Center (NTNFC) with its overarching national-level technical forensics stewardship and integration mission. In addition to leading the NTNFC, DNDO is responsible for the DHS mission in pre-detonation materials forensics. This area is focused on bulk analysis and integration of all sources of technical information, including isotopic and chemical composition, physical structure, and route attribution. We will help develop and sustain pre-detonation concept of operations and technical capabilities to handle and analyze nuclear and radiological materials; establish, maintain, exercise, and operate collection and analysis capabilities for pre-detonation materials in support of the law enforcement community; and support appropriate research and development activities to address gaps and shortfalls in forensics capabilities.

Effective response to nuclear and radiological threats

As nuclear detection technology is deployed across the global architecture, the Federal government must commit to providing the necessary technical support to ensure that equipment is used effectively, alarms are resolved accurately, and the appropriate personnel are notified in the event of a legitimate detection of a threat. In recognition of this need, the DNDO provides operational support services; including 24/7 technical reachback support for alarm resolution, effective training and response protocols, and operational support coordination to ensure appropriate expertise is in place to support prompt resolution of nuclear/radiological detection alarms. The effective utilization of these services will ensure that deployed equipment is properly used and alarm information is appropriately reported and escalated to response agencies. While DNDO is responsible for coordination of the response to nuclear and radiological threats, the DOE, FBI, and DOD are responsible for deploying personnel in the event of an alarm and have the necessary technical expertise to help identify the item in question.

DNDO is also taking steps to expand detection capabilities within the domestic interior. Within our Nation's borders, we are leveraging and strengthening existing commercial vehicle inspection programs and surveillance capabilities to make domestic detection more effective and these initiatives will make use of next generation equipment deployments. We have launched the Southeast Transportation Corridor Pilot program to deploy radiation detectors to interstate truck weigh stations and other sites. These deployments will be at locations agreed to by our

regional partners in accordance with the domestic detection architecture developed by the DNDO. Grants will be available initially targeting the states of Georgia, Kentucky, South Carolina, Tennessee, and Virginia; to be followed by expected expansion into Alabama, Florida, Mississippi, North Carolina, and Washington DC in fiscal year 2007. Included in the pilot program will be the necessary training, technical reachback and operational protocols.

As Secretary Chertoff officially announced in July, we have launched the Securing the Cities program (SCP), that will enhance protection and response capabilities in and around the Nation's highest risk urban areas. The DNDO will initially work with major metropolitan agencies in the New York City area, as well as New York State and other Northeast regional partners, to develop preventive radiological/nuclear detection programs. This initiative will include an analysis of critical road networks, mass transit, maritime, rail, and general aviation vulnerabilities. SCP will identify infrastructure protection and information sharing improvements, fixed and mobile detection deployment augmentation requirements, and source security enhancements. The initiative will include integrated training and exercise opportunities in support of the New York City area and Northeast region. The DNDO and regional partners will jointly develop analysis-based detection architectures, to include all necessary planning, equipment, training, exercises, and operational support infrastructure. As these initiatives mature, it is expected that equipment (including Advanced Spectroscopic Portal systems) will be deployed and operated and the lessons learned will be exported to other regions and cities to enhance our overall protection against nuclear and radiological threats. We are currently in the midst of our program design and deployment planning phase for this initiative.

Conclusion

As the National Academies report concluded in 2002, while progress was being made by the R&D and policy communities related to nuclear and radiological terrorism, a key deficit in USG efforts was the lack of coordination across the Departments and agencies The founding of the DNDO as an interagency coordinating office, its focus on the entire global architecture, and the desire to produce technological solutions which benefit the entire homeland defense community, directly addresses this concern.

Yet, while technology is a critical tool in combating the nuclear threat, the threat we face cannot be effectively overcome by technology alone. Coordination between Federal, State, tribal, and local law enforcement agencies, as well as the larger intelligence and counterterrorism communities, is critical. An integrated and cooperative approach to detection and information analysis will ultimately provide substantial improvement in alarm resolution, threat assessments, data trend analysis, and, most importantly, overall probability of mission success.

This concludes my prepared statement. With the committee's permission, I request my formal statement be submitted for the record. Chairman Linder, Ranking Member Langevin, and Members of the Subcommittee, I thank you for your attention and will be happy to answer any questions that you may have.